

Spot Safety Project Evaluation

Project Log # 200703094

Spot Safety Project # 03-99-205

Spot Safety Project Evaluation of the Installation of a Traffic Signal and Right Turn Lane At the Intersection of SR 1308 (Gum Branch Rd) and SR 1322 (Summersill School Rd) Onslow County

Documents Prepared By:

Safety Evaluation Group
Traffic Safety Systems Management Section
Traffic Engineering and Safety Systems Branch
North Carolina Department of Transportation

Principal Investigator

Brad Robinson, EI

7/25/2008
Date

Traffic Safety Project Engineer

Spot Safety Project Evaluation Documentation

Subject Location

Evaluation of Spot Safety Project Number 03-99-205 – The Intersection of SR 1308 (Gum Branch Rd)) and SR 1322 (Summersill School Rd) in Onslow County.

Project Information and Background from the Project File Folder

The spot safety project improvement countermeasures chosen for the subject location were to install a multi-phase traffic signal and to construct a right turn lane on SR 1322 (Summersill School Rd) .

The subject location is a three-leg intersection which was controlled by a stop sign on SR 1322 in the before period. SR 1308 (Gum Branch Rd) is a major arterial linking Jacksonville and Richlands. At the subject location SR 1308 is transitioning from a five lane cross section to a two lane section. There is a left turn lane on the northwest approach of SR 1308. SR 1322 had a single lane approach in the before period. The speed limit is 45 mph for SR 1308 and 35 mph for SR 1322.

The original intersection investigation was requested by the PTO of a local school. The letter mentioned that during rush hour, gaps in SR 1308 traffic were nearly non-existent. They felt the intersection was too dangerous for school buses to safely enter the intersection.

The initial crash analysis was conducted from January 1, 1996 to December 31, 1998 with a total of 5 crashes, 1 of which (a Rear-End) was considered correctable by the chosen countermeasures. The final completion date for the improvements at the subject intersection was on March 28, 2002 with a total cost of \$60,000.00.

Naive Before and After Analysis

After reviewing the spot safety project file folder along with all the crashes at the subject location, the crash data omitted from this analysis to consider for an adequate construction period was from February 1, 2002 to May 31, 2002. The before period consisted of reported crashes from August 1, 1996 through January 31, 2002 (5 years and 6 months) and the after period consisted of reported crashes from June 1, 2002 through November 30, 2007 (5 years and 6 months). The ending date for this analysis was limited by the available crash data at the time the analysis was completed.

The treatment data consisted of all reported crashes within 150 feet of the subject intersection. The following data table depicts the Naive Before and After Analysis for the treatment location. Please note that both Rear-End Crashes on SR 1322 and Frontal Impact crash types were the Target Crashes for the applied countermeasures. Frontal Impact crash types considered are as follows: Left Turn, same roadway; Left Turn, different roadway; Right Turn, same roadway; Right Turn, different roadway; Head On and Angle. The target crashes are clearly identified in the before and after period collision diagrams.

<u>Treatment Information</u>			
	Before	After	Percent Reduction (-) Percent Increase (+)
Total Crashes	5	10	100.0
Total Severity Index	3.96	3.22	-18.7
Target Crashes	4	4	0.0
Target Crash Severity Index	4.7	4.7	0.0
Volume	22,000	30,000	36.4
<u>Crash Severity Summary</u>			
Fatal Crashes	0	0	N/A
Class A Crashes	0	0	N/A
Class B Crashes	2	1	-50.0
Class C Crashes	0	2	N/A
PDO Crashes	3	7	133.3

The naive before and after analysis at the treatment location resulted in a 100 percent increase in Total Crashes, no change in Target Crashes, and a 36 percent increase in Average Daily Traffic (ADT). The before period ADT year was 1999 and the after period ADT year was 2005.

Results and Discussion

The naive before and after analysis involving the comparison of treatment actual before data versus treatment actual after data resulted in a 100 percent increase in Total Crashes and no change in Target Crashes. The Total Severity Index decreased by 19 percent, while the Target Crash Severity Index remained constant. The summary results above demonstrate that Total Crashes appear to have increased at the treatment location from the before to the after period although Target Crashes remained constant.

The calculated benefit to cost ratio for this project is -0.54 considering total crashes. The benefit to cost ratio considering only target crashes is 0.0. The benefits are calculated using the change in annual crash costs from the before to the after period. Operational and other benefits related to the project are not considered in this analysis. The costs of the project include the actual construction costs as well as the increase in annual maintenance and utility costs.

Referencing the *Collision Diagrams*, both Rear-End crashes on SR 1322 and Frontal Impact Crashes remained constant from the before to the after period. There were no noticeable patterns of crashes for either Target Crash type considering that the periods were 5.5 years.

Rear-End crashes on westbound SR 1308 account for all non-target crashes in the after period. There were three that occurred between vehicles approaches the intersection. Rear-End Crashes such as these are usually expected when a signal is installed. Three Rear-End Crashes occurred between vehicles that had already traveled through the intersection. There are several driveways on

both sides of the roadway west of the intersection that might account for the stopped or slowed vehicles. The increase in ADT might account for these crashes also.

As the Safety Evaluation Group completes additional spot safety reviews for this type of countermeasure, we will be able to provide objective and definite information regarding actual crash reduction factors for this type of intersection.

BENEFIT-COST ANALYSIS WORKSHEET

LOCATION: SR 1308 at SR 1322
 COUNTY: Onslow
 FILE NO.: SS 03-99-205

BY: Brad Robinson
 DATE: 7/10/2008

DETAILED COST: TYPE IMPROVEMENT - Signal and Right Turn Lane

ITEMS	TOTAL	SERVICE	CRF	ANNUAL COST
Construction	\$0	0	0.000	\$0
	\$60,000	10	0.149	\$8,942
Right-of-Way	\$0	0	0.000	\$0

TOTALS	\$60,000	10	0.149	\$8,942
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ESTIMATED INCREASE IN ANNUAL MAINT. COST =	\$2,000
ESTIMATED INCREASE IN ANNUAL UTILITY COST =	\$900
TOTAL ANNUAL COST=	\$11,842
TOTAL COST OF PROJECT=	\$60,000

COMPREHENSIVE COST REDUCTION:

ESTIMATED NUMBER OF ANNUAL ACCIDENT DECREASES

TIME PERIOD	YEARS	K & A CRASHES	K & A CRASHES PER YR	B & C CRASHES	B & C CRASHES PER YR	PDO CRASHES	PDO CRASHES PER YR	ANNUAL COSTS
BEFORE	5.50	0	0.00	2	0.36	3	0.55	\$9,145
AFTER	5.50	0	0.00	3	0.55	7	1.27	\$15,582

Annual Benefits from Crash Cost Savings (\$6,436)

NET AVG. ANNUAL BENEFITS = AVG. ANNUAL BENEFITS - TOTAL ANNUAL COST	=	(\$18,278)
BENEFIT-COST RATIO = AVG ANNUAL BENEFITS/TOTAL ANNUAL COST	=	-0.54

TOTAL COST OF PROJECT	-	\$60,000	COMPREHENSIVE B/C RATIO	-	-0.54
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BENEFIT-COST ANALYSIS WORKSHEET

LOCATION: SR 1308 at SR 1322
COUNTY: Onslow
FILE NO.: SS 03-99-205 Target Crashes

BY: Brad Robinson
DATE: 7/10/2008

DETAILED COST: TYPE IMPROVEMENT - Signal and Right Turn Lane

ITEMS	TOTAL	SERVICE	CRF	ANNUAL COST
Construction	\$0	0	0.000	\$0
	\$60,000	10	0.149	\$8,942
Right-of-Way	\$0	0	0.000	\$0

TOTALS	\$60,000	10	0.149	\$8,942
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ESTIMATED INCREASE IN ANNUAL MAINT. COST =	\$2,000
ESTIMATED INCREASE IN ANNUAL UTILITY COST =	\$900
TOTAL ANNUAL COST=	\$11,842
TOTAL COST OF PROJECT=	\$60,000

COMPREHENSIVE COST REDUCTION:

ESTIMATED NUMBER OF ANNUAL ACCIDENT DECREASES

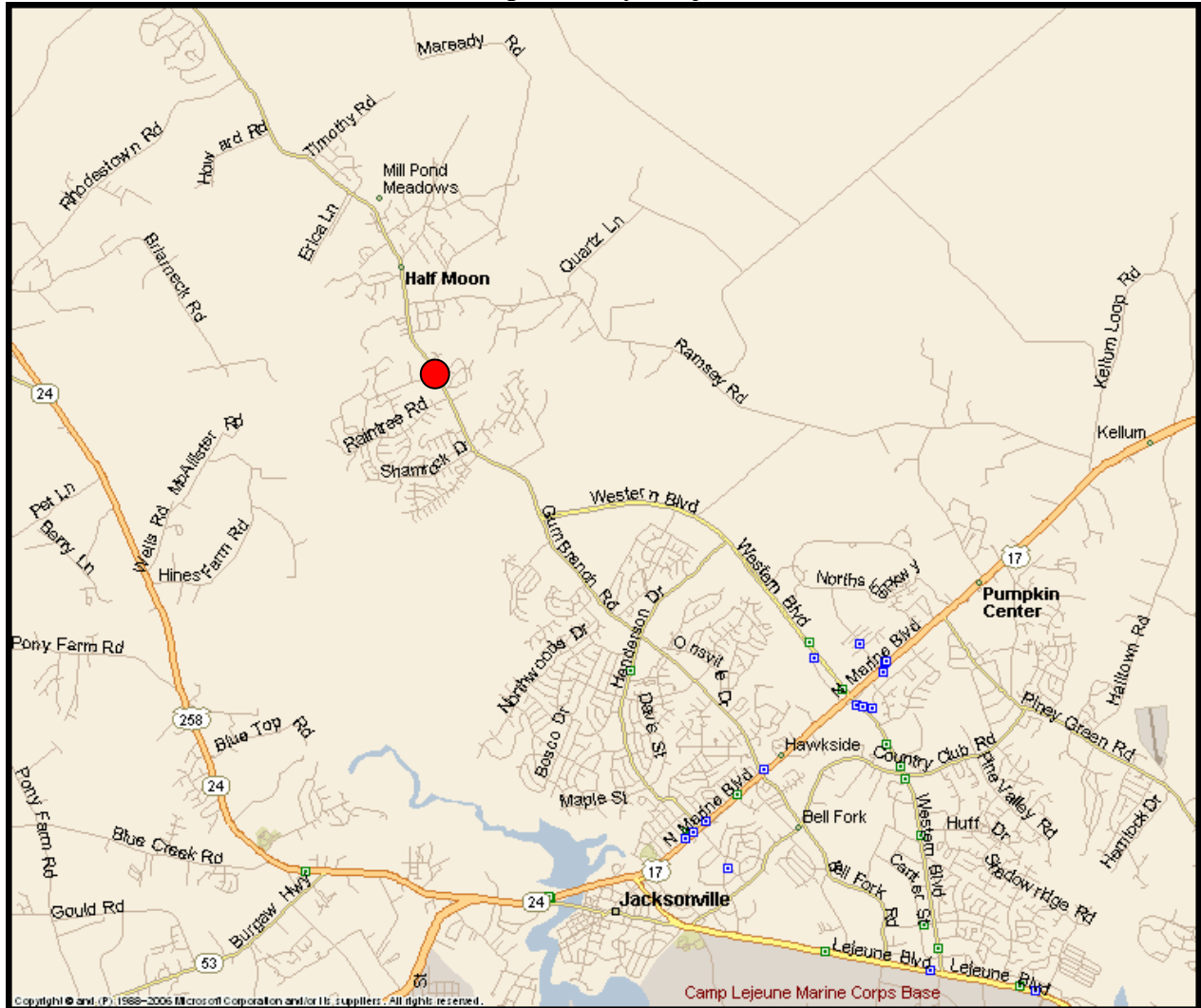
TIME PERIOD	YEARS	K & A CRASHES	K & A CRASHES PER YR	B & C CRASHES	B & C CRASHES PER YR	PDO CRASHES	PDO CRASHES PER YR	ANNUAL COSTS
BEFORE	5.50	0	0.00	2	0.36	2	0.36	\$8,400
AFTER	5.50	0	0.00	2	0.36	2	0.36	\$8,400

Annual Benefits from Crash Cost Savings	\$0
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NET AVG. ANNUAL BENEFITS = AVG. ANNUAL BENEFITS - TOTAL ANNUAL COST	=	(\$11,842)
BENEFIT-COST RATIO = AVG ANNUAL BENEFITS/TOTAL ANNUAL COST	=	0.00

TOTAL COST OF PROJECT	-	\$60,000	COMPREHENSIVE B/C RATIO	-	0.00
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Location Map
Onslow County
Evaluation of Spot Safety Project #03-99-205



Treatment Location: SR 1308 (Gum Branch Rd) at SR 1322 (Summersill School Rd)

Treatment Site Photos Taken May 14, 2008



Traveling Northwest on SR 1308 (Gum Branch Rd)



Traveling Northwest on SR 1308 (Gum Branch Rd)



Traveling Southeast on SR 1308 (Gum Branch Rd)



Traveling Southeast on SR 1308 (Gum Branch Rd)



Traveling East on SR 1322 (Summersill School Rd)



Traveling East on SR 1322 (Summersill School Rd)

Onslow County
SR 1308 (Gum Branch Rd) at
SR 1322 (Summersill School Rd)
Before Period
From 8/1/1996-1/31/2002

→

MOVING VEHICLE

- - - →

PEDESTRIAN

⊠

PARKED VEHICLE

⊠ ↗

PARKING VEHICLE

□

FIXED OBJECT

→ ⊥ →

HEAD ON

→ ⊥ ←

REAR END

→ ⊥

RAN OFF ROAD

↘

ANGLE

↘ ↘

TURNING

↘ ↘ ↘

BACKING

↘ ↘ ↘ ↘

SIDESWIPE

→ ○ ○ →

OUT OF CONTROL

→ ⊥ ⊥

INJURY

→ ⊥ ⊥ ⊥

FATALITY

→

9 MPH OR LESS

→

10 MPH TO 19

→

20 MPH TO 29

→

30 MPH TO 39

→

40 MPH TO 49

→

50 MPH TO 59

→

60 MPH TO 69

→

70 AND UP

→

SPEED UNKNOWN

→

DAYLIGHT CRASH

→

DARK CRASH

P

PEDESTRIAN

B

BICYCLE

T

TRAIN

A

ANIMAL

*

DRIVER AT FAULT

D

DRY

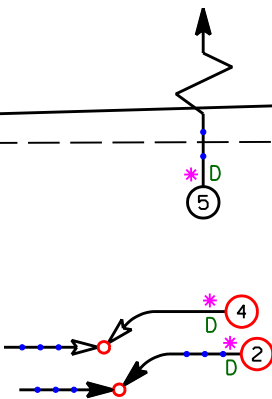
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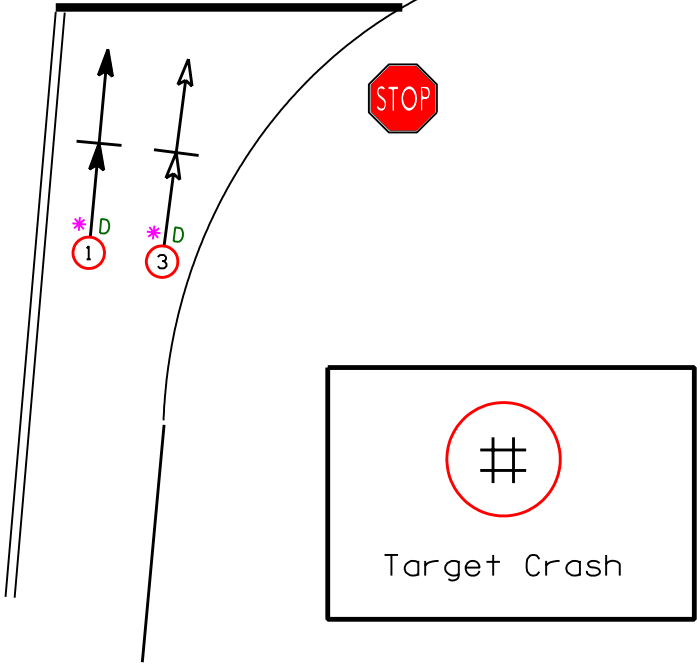
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ICY OR SNOWY

SR 1308
(GUM BRANCH RD)
45 mph



SR 1322
(SUMMERSILL SCHOOL RD)
35 mph



TRAFFIC SAFETY SYSTEMS MANAGEMENT UNIT

HIGHWAY SAFETY IMPROVEMENT PROGRAM

SAFETY INFORMATION MANAGEMENT AND SUPPORT

SAFETY EVALUATION

TRAFFIC SAFETY

COLLISION DIAGRAM

DIVISION: 3

AREA: ..

STUDY PERIOD: 8/1/1996 TO 1/31/2002

DISTANCE: Y-LINE: 150 FT

ANALYSIS PREPARED BY: B. Robleson

DIAGRAM PREPARED BY: B. Robleson

DIAGRAM REVIEWED BY:

SCALE: NOT TO SCALE

DATE: Apr 11 2008

LOG NUMBER: 200703094

N.C. DEPARTMENT of TRANSPORTATION

DIVISION of HIGHWAYS

TRAFFIC ENGINEERING AND SAFETY

SYSTEMS BRANCH

Onslow County
SR 1308 (Gum Branch Rd) at
SR 1322 (Summersill School Rd)
After Period
From 6/1/2002-11/30/2007

LEGEND			
	MOVING VEHICLE		ANGLE
	PEDESTRIAN		TURNING
	PARKED VEHICLE		BACKING
	PARKING VEHICLE		SIDESWIPE
	FIXED OBJECT		OUT OF CONTROL
	HEAD ON		INJURY
	REAR END		FATALITY
	RAN OFF ROAD		9 MPH OR LESS
			10 MPH TO 19
			20 MPH TO 29
			30 MPH TO 39
			40 MPH TO 49
			50 MPH TO 59
			60 MPH TO 69
			70 AND UP
			SPEED UNKNOWN
			DAYLIGHT CRASH
			P PEDESTRIAN
			B BICYCLE
			T TRAIN
			A ANIMAL
			* DRIVER AT FAULT
			D DRY
			W WET

